

Tree Planting and After-Planting Maintenance

After you've selected high-quality nursery stock from a reputable nursery and well-adapted to the soils and climate at your planting site, it's time to develop a plan for getting them in the ground. One obvious question you need to answer is, "Who is going to do the work?" Will you do all of the work by yourself? Have family or friends helping you? Will you hire a professional tree planting contractor? Use volunteers from the community? Any time you use volunteers, make sure they are people who genuinely want to be there and care about the success of the project. People who were somehow coerced into being there will not do a good job of planting and will end up killing trees. Even if you have a crew of eager and willing volunteers, it is critical that you make sure each and every one of them is trained in the proper techniques to make sure the trees are planted in such a way so they survive and grow.

Another thing you must decide is how to dig the holes. A tree planting machine is pulled behind a tractor and opens up a shallow trench. The root systems of the trees are placed in the trench, then packing wheels close it back up again. This technique is OK for planting thousands of low-cost seedlings quickly and cheaply, with the understanding that mortality among the seedlings will be high. The machine presses the root systems into a more-or-less two dimensional space, and only the strongest stock will recover from this. To plant bare-root trees in such a way to give them the best chance to survive and thrive, you need to custom-dig a planting hole that matches the size and shape of the root system of the tree you are planting. You must never jamb a root system into a hole too small for it, or allow the root tips to bend around the sides of the hole. This takes a shovel and a lot of work for each tree. Another consideration is that bare-root trees must be dormant when they are planted. For areas where the ground freezes solid in winter, there is only a narrow window of opportunity to plant in the spring, between when the frost goes out of the ground and the nursery stock breaks dormancy and starts to grow. Sometimes the weather just does not cooperate during this narrow window. Fall planting bare-root stock is usually only an option for evergreens which go dormant in August. If you wait until broadleaf trees go dormant in October and then try to plant them bare-root, frost action will usually heave them right up out of the ground over the course of the winter, leaving the root crown several inches above the soil surface. This is usually lethal to them. For these reasons, bare-root tree planting is recommended for professionals. For the rest of us, container-grown trees or "potted stock" is the best choice. It is important to use stock grown in containers that prevent root spiraling. Stock grown in conventional pots and have spiraling roots will have slow growth and a short life span, and you can't fix spiraling roots by pruning. Holes for potted stock can be dug with either an auger or a narrow shovel called a "tiling spade." The hole can be dug to about the same size, shape, and depth as the container or pot holding the tree. This is cheaper, faster, easier, and less likely to result in errors resulting in lost trees.

Once your hole is dug, you need to get the root system of the tree planted in the hole at the correct depth. The "root crown" of a tree is the point at which the trunk of the tree meets the root system. You can often see a distinct color change between trunk and root, but not always. It is critically important to plant the tree in such a way that the root crown is level with the soil surface. For some reason, many

people—even professional landscape architects—are tempted to plant trees “just a little deeper” than they were growing in the pot or in the ground, the way you would plant a tomato. While there are some trees that can survive such gross abuse, many can not. You should never bury any part of the tree’s trunk. Planting as little as ½” too deep can be lethal to many trees.

If you’re planting bare-root stock, hold the trunk of the tree with one hand so the root crown is exactly level with the soil surface, while you use your other hand back-fill with loose soil around the roots. Press the soil down firmly with your hand to fill voids and to keep the soil and the tree from settling deeper after a rainfall. If you are planting container-grown stock, place the tree, container and all, in the hole. Make sure the root crown is level with the soil surface. If the depth is correct, take the tree back out of the hole, remove it from the container, then place the tree back in the hole. If the depth is not right, add soil or dig it deeper as is appropriate. Hold the tree at the correct position with one hand as you backfill with loose soil. Be sure to fill all of the voids between the root ball and the sides of the hole.

Once a tree is planted, it is time to apply post-planting maintenance. The two most important considerations are protection from weed competition, and protection from animals. In some areas, and in some situations, there may be additional considerations such as need for supplemental water, protection from diseases, and protection from insect pests. Some people advocate for planting more trees than they want to end up with, and then just let nature take its course, providing no after-planting care. They say, “This is how Mother Nature plants trees.” While this is true, it is also true that Mother Nature plants anywhere from ten thousand to ten million (depending on the species) seedlings for every one that makes it to maturity. It is much more cost-effective to plant the number of trees you want, and then do whatever it takes to ensure that every one of them survives and thrives.

Deer and rabbits are usually the worst offenders, but other animals known to kill or damage trees include pocket gophers, voles, and raccoons. 5’ tall, well-ventilated tree shelters or “grow tubes” such as those made by Plantra (plantra.com) offer the best and most economical protection from deer and rabbits. Besides deer and rabbit protection, tree shelters offer a number of other benefits. They significantly reduce tree mortality from other causes, they make the trees grow faster and start bearing fruit or nuts years earlier, and they reduce or eliminate the need for pruning below 5’. In areas with elk or moose, tree shelters may need to be 6’ tall. The best way to limit damage from voles is to keep the vegetation between the trees mowed short (like a lawn). This allows predators like fox, coyote, hawks, owls, and house cats to catch the voles and keep their populations under control. If mowing is not practical, mothballs can be dropped down inside the tree shelters. This will keep voles and other mice from wanting to nest inside them. Moth balls will have to be replaced periodically. Gophers are usually less of a problem, but if they become too numerous, they may need to be controlled by trapping or poisoning. Raccoons often dig up newly planted trees, presumably expecting to find food cached at the bottoms of the holes. It may be necessary to get up early every morning, go out and replant trees dug up by raccoons. After a week or so, when the smell of freshly dug soil dissipates, raccoons will stop digging up trees.

When trees reach about 1 ½” in trunk diameter at the point where they come out the top of the tree shelter, it’s time to remove the shelter. At this point, the tree is safe from browsing by deer and rabbits,

but is vulnerable to being rubbed by the antlers of buck deer during the rut. To protect them from this, you can use 6" diameter black, corrugated drain tile. Cut the tile into lengths of about 20" each, then cut a slit in each piece from one end to the other. This will allow you to spread the slit open and push it on to the trunk of the tree. This will prevent bucks from rubbing the tree. You can now remove the tree shelter by slitting it from top to bottom with a box cutter or sharp knife, then pull it off.

Probably the single biggest reason for the failure of tree plantings is absent or inadequate weed control. Broadleaf weeds grow faster than newly planted trees, and they overtop the trees and out-compete them for sunlight. This should be avoided, but is nowhere near as serious as competition from grasses. Tree roots need space between soil particles for room to grow. Grass roots tend to fill up all of the spaces between soil particles, leaving no place for growing tree roots, as well as competing for moisture and nutrients. The worst grasses, in order, include reed canary grass, smooth brome, orchard grass, and tall fescue. The roots of goldenrod and alfalfa exude chemicals that inhibit the growth of tree roots. None of these plants should be growing near your tree planting. That said, you need to have something growing on the ground between trees to control erosion. One good ground cover mix that is compatible with trees and adapted to USDA plant zones 4-7 is (turf type, not forage type) perennial rye grass, creeping red fescue, and Dutch white clover. This ground cover will protect the soil from erosion without competing too much against the tree roots. Even this cover needs to be kept away from the base of newly planted trees. While it can be accomplished with tillage, this is expensive, labor intensive, and risks damage to tree roots. There are two alternatives that are practical and economically feasible. One is to use a combination of landscape fabric (minimum 3' square) topped with 2" to 4" of wood chips or similar mulch. Neither the mulch by itself, or the fabric by itself, is very effective, but when you use them in combination, it is very close to 100% effective weed control. An additional benefit to this approach is that it helps conserve soil moisture around the planting site. It is important to use at least 9 turf staples to hold the fabric down. One staple at each corner, one halfway between each corner, and one in the center, to hold the slit for the seedling closed. Failure to adequately staple down the fabric may result in it being sucked up into mower blades. If this happens, the seedling tree may be ripped out of the ground and hurled 50' through the air. While this weed control technique is feasible and the most effective option for those who do not want to use chemicals, it is expensive. If you can get the wood chips or other mulch for free, it will still add about \$1000 per acre to the cost of a planting project. If you have to buy the mulch, it will be even more expensive.

An alternative weed control strategy is to use herbicide. The old standard mix used by foresters and other tree planters for many decades was simazine, oryzalin, and glyphosate (Princep, Surflan, and Roundup). This mix, used according to label directions, provided about 2 months of weed control. It was not ideal, but it is what we had. Today we have the herbicide sulfometuron methyl (Oust). It is used at a very low rate. For a tree planting, the cost of the chemical is about 5 cents per acre, plus about \$10 per acre for the labor to apply it (in a 3' circle around the base of each tree). If used according to label directions, a single application controls grasses and broadleaf weeds for anywhere from 6 months up to 18 months (average about one year), depending on rainfall.

When most trees reach about 4" in trunk diameter at breast height, and around 10' to 15' tall, they no longer need weed control to maintain growth. When they get big enough to push the 6" drain tile off,

they are usually no longer vulnerable to antler rubbing by buck deer. While some trees need ongoing maintenance such as spraying, pruning and/or irrigation, most need no more additional help from humans at this point, and you may even aggressively neglect them if you wish. They'll be OK.